

ENGINEERING DIRECTIVE
CHIEF ENGINEER**OBSOLETE**MUNICIPAL PROJECTS
DISTRICT RESPONSIBILITY/

DESIGN STANDARDS AND THE DESIGN WAIVER PROCESS

Purpose

The following directive is intended to provide interim guidance, until approval and publication of the revised MassHighway Design Manual, for project initiation and approval, design standards, and the design waiver process for municipal projects. Adherence to this directive will help to provide statewide and district wide consistency when implementing municipal projects. Portions of this directive concerning design standards and the waiver process are also applicable to other MHD roadway projects. This directive does not apply to "Footprint" bridges where the existing **Design Policy - Bridge R&R Program for Non-NHS Roadways** continues to apply.

District Responsibility

When a project has been requested by a municipality, the District shall meet with the municipality to discuss and review the project parameters, design criteria, the requirements for a Functional Design Report (Safety and Design Report) and the need for strong community support with the municipality. The District shall also determine whether design waivers may be required, what environmental permits may be needed, and whether the project will require full size plans.

After determining the scope of the project which may be resurfacing/rehabilitation, minor or major reconstruction, or new construction, the District shall then make a recommendation to the municipality on how to proceed. This may include a recommendation to use Chapter 90 funding rather than requesting other Department funds. The District may also recommend that an informational meeting be held to determine the degree of community support prior to formally requesting the project.

After satisfactory completion of this review, the municipality shall send a formal written request to the District and the RPA. The District shall then make a formal recommendation to the Project Review Committee using the standard

request form. The District shall notify the PRC on this form whether any design waivers may be required, the specific waiver (s) requested, and the magnitude of the deviation from minimum standards.

If the District determines that the project is essentially a resurfacing/ rehabilitation project; requires less than full size plans; has only minor geometric changes; has only construction easements and no land takings; has minimal environmental impacts; and does not require a Design Public Hearing, the District will recommend to the PRC that the project assigned to the District (as Project Manager) and processed through the Highway Engineering Division's Highway Location and Design Section's Resurfacing Unit. All other municipal projects will be assigned to either the Engineering Expediting Section or the Traffic Engineering Section who will function as Project Manager.

Design Standards

The following shall apply to the use of design standards:

Design standards are based on safety and capacity studies performed through AASHTO and other engineering research organizations. The standards have been developed from and are used to define the physical characteristics of the roadway. Therefore:

Design standards are not dependent on the source of funding for the project. The roadway standards are the same whether the project is non-federal aid, or funded with any category of federal funds.

The **design standards** are based on the functional classification of the roadway. This classification is as approved by MHD, the RPA's, and FHWA and is available through the BTP&D's Functional Classification maps and listings.

Design speed (based on the AASHTO definitions) shall define and be applied in the design of roadways. Other definitions of "speed" of the roadway (i.e. running speed, posted speed, etc.) shall not be used in design.

Table 5.1 from the **1994 Draft Metric Highway Design Manual** (as revised and attached) shall be used as the minimum and desirable standards for lane and shoulder width.

Chapter 8 of the **1989 Highway Design Manual** shall be disregarded in its entirety. There is no longer a "3R" funding category. Design standards apply

to roadways regardless of type of funding or project.

Usable shoulder as defined by AASHTO is the "shoulder" required for design. An absolute minimum additional 0.5 meters is required as an offset from usable shoulder to vertical elements taller than 150 mm (i.e. guardrail, barrier curb, walls, etc.).

Bicycles and pedestrians must be accommodated within the roadway corridors where access to the roadway is legally permitted. The usable shoulder (from Table 5.1) shall include a desirable (preferred) paved width of 1.25 meters (0.75 meters minimum) to accommodate bicycles. If accommodations for bicycles can not be provided, a design waiver request **must** be submitted at the 25% stage.

Design Waivers

Desirable design standards should be used wherever possible. Use of values below desirable standards must be justified in the Functional Design Report. **Use of design values below minimum MHD standards require design waivers.**

A **Functional Design Report** (Safety and Design Report) should be prepared by the municipality. The design waiver request should accompany this report and must be submitted with the 25% submission. Evidence that the community does not support the use of minimum design standards for the project may not be used as a basis for a design waiver. Approval of the design waiver and the 25% submission will be subject to documented results of the Design Public Hearing.

The municipality must submit the design waiver request to the appropriate Project Manager (District or Boston HQ) for review. The responsible Section Head (Highway Design, Expediting, Traffic) will then review the request with the District and make a recommendation to the Chief Engineer for his determination. After Chief Engineer approval, federally funded - NHS projects shall be forwarded to FHWA for their determination. The design waiver approvals must then be kept in a permanent project file for future reference.

The design waiver request must include, at a minimum, a description of the existing conditions and problems, the proposed solution, reference to applicable design standards, and appropriate justification for use of reduced criteria. The Mass Highway Design Manual and applicable Department policy and directives shall be the first source of reference. Reference to AASHTO publications such as the "Green Book" and other appropriate technical publications may be used to facilitate the waiver process. Other reasons for justification may include:

- low numbers of accidents
- significant right of way restrictions
- wetland impacts
- Scenic Roads
- parks, agricultural, conservation areas
- historical/archaeological restrictions
- trees or protected stone walls
- other environmental impacts
- conformity with adjacent roadway sections

In general, less detailed justification will be required for resurfacing/rehabilitation/reconstruction projects. The highest degree of justification will be required for work on NHS facilities.

The 100% PS&E transmittal to CEPO must include a reference to all design waivers granted for the project.

Absolute Minimum Criteria

The following values are "**absolute**" **minimums** below which design waivers will not be approved. Design waivers are required, however, for use of these substandard values. If these values cannot be met, the project shall be denied for funding through the Department. It may, however, be considered as a maintenance (resurfacing) project for which the municipality may use Chapter 90 funds or seek other funding sources to maintain the roadway in its existing configuration.

Rural Arterials

- 3.5 meter travel lanes
- 1.25 meter outside usable shoulder

Urban Arterials

- 3.25 meter travel lanes
- 0.0 meter usable shoulder (plus 0.5 meter paved offset to travel lane)

Rural Collectors

- 3.25 meter travel lanes
- 0.75 meter outside usable shoulder

Urban Collectors

3.25 meter travel lanes

0.0 usable shoulder (plus 0.5 meter paved offset to travel lane)

Local Roads

6.0 meters paved (two travel lanes) plus 0.5 meter (paved or graded) offsets

All Roadways

0.5 meter offset to vertical elements taller than 150 mm from usable shoulder

0.5 meter offset to roadway edge from travel lane (when usable shoulder not provided)

**Table 5.1
RECOMMENDED ROADWAY SECTION WIDTHS**

FUNCTIONAL CLASS	U/R	NUMBER OF LANES	TRAVEL LANE MIN	USABLE SHOULDER ⁵	
				RIGHT MIN	LEFT MIN
FREEWAY	URBAN	4 - 8	3.75	3.0	1.25'
	RURAL	4 - 8	3.75	3.0 <i>MIN DESIR</i>	1.25'
ARTERIAL	URBAN	WITH MEDIAN	3.75	2.5 - 3.0 ²	1.25'
	URBAN	WITHOUT MEDIAN	3.75	2.5 - 3.0 ²	N/A
	RURAL	WITH MEDIAN	3.75	2.5 - 3.0 ²	1.25
	RURAL	WITHOUT MEDIAN	3.75 <i>MIN DESIR</i>	2.5 - 3.0 ²	N/A
COLLECTOR	URBAN		3.5 - 3.75	1.25 - 2.5 ²	N/A
	RURAL		3.5 - 3.75	1.25 - 2.5 ²	N/A
LOCAL ²	URBAN		3.0 - 3.75	0.75 - 1.25 ²	N/A
	RURAL	N/A	3.0 - 3.75	0.75 - 1.25 ²	N/A
SPECIAL PURPOSE ROADS		SEE AASHTO DESIGN CRITERIA			

- Notes:**
1. USE 3 METERS WHEN 3 OR MORE LANES IN EACH DIRECTION.
 2. WIDTHS ARE TO BE DETERMINED BASED ON TRAFFIC, BICYCLE AND PEDESTRIAN VOLUMES, PARKING REQUIREMENT, RIGHT OF WAY RESTRICTIONS AND ENVIRONMENTAL IMPACTS. THE WIDER SHOULDER WIDTH IS PREFERRED FOR PARKING AND TURNING, AND/OR BICYCLE OR PEDESTRIAN USE.
 3. *NOTE: PAGE 5.3 & 5.7 are deleted from the Draft Manual*
 4. DESIGN WAIVERS MUST BE OBTAINED FOR ROADWAY WIDTHS BELOW THESE MINIMUM STANDARDS SEE CHAPTER EIGHT FOR INFORMATION ON DESIGN WAIVERS.
 5. SHOULDER DIMENSIONS ARE FOR "USABLE" SHOULDER. THE OFFSET DIMENSION (0.5 M MINIMUM) IS TO BE ADDED TO THE USABLE SHOULDER DIMENSION WHERE VERTICAL ELEMENTS (GUARDRAIL CONCRETE BARRIER, BARRIER CURB, ETC.) ARE LOCATED AT THE EDGE OF THE "GRADED" SHOULDER.
(over 150mm)

STANDARD WIDTHS TO BE USED (M)

LANES
3.75
3.50
3.25
3.00

SHOULDER
3.50
3.00
2.50
1.25
0.75

ABSOLUTE MINIMUM OFFSET
BEYOND SHOULDER TO
VERTICAL ELEMENT (over 150mm)
0.50